REMARKS

In the foregoing amendments, editorial amendments were made to clailms 40-44. Claims 40-52 remain in the application for consideration by the examiner.

The Official action objected to claims 49 and 50 in section 2 on page 2. The informality noted in this objection was corrected in the response after final filed on June 10, 2004. The amendments set forth in the response after final must be entered into the application, because prosecution was reopened, after the response after final was filed. Since the preambles of claims 49 and 50 were previously, applicant respectfully requests that the examiner reconsider and withdraw the objection to claims 49 and 50 as set forth in the outstanding Office action.

The Official action set forth a single new rejection where all the claims (40-52) are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. patent No. 6,014,398 of Hofmann *et al.* (Hofmann) and U.S. patent No. 6,130,904 of Ishihara *et al.* (Ishihara).

Applicant greatly appreciates the courtesies extended by examiner Cornelius H. Jackson to the undersigned in a personal interview March 16, 2005. At the personal interview, the teachings of Hoffman and Ishihara were discussed. The examiner agreed that the prior art of Hoffman and Ishihara fails to teach the claimed invention because they do not teach unexpected results of applicants claimed invention, which is to maximize output energy of

excimer laser and minimize a dispersion of the output energy. In addition, the examiner agreed that the prior art fails to teach the specific range of approximate 10 ppm, which it acquired an applicant's claims.

Applicant respectfully submits that the teachings of Hoffman either alone or combined with those of Ishihara cannot establish a *prima facie* case of obviousness for the presently claimed invention within the meaning of 35 U.S.C. § 103(a). In addition, applicant respectfully submits that any rejection based on obviousness over the teachings of Hoffman combined with those of Ishihara is rebutted and overcomed by the unexpected advantages achieved by the presently claimed invention. Namely, the amounts of xenon gas in the laser gas mixture as presently claimed provides unexpected advantages and/or results that distinguish the invention claimed from the teachings of Hoffman and Ishihara. Therefore, applicant respectfully submits that the presently claimed invention is patentable over these teachings within the meaning of 35 U.S.C. § 103.

Applicant respectfully submits that the teachings of Hoffman and Ishihara do not disclose or suggest the presently claimed invention within the meaning of 35 U.S.C. § 103 for at least the following reasons.

1. The teachings of Hoffman and Ishihara do not contemplate or suggest any sequence of supplying a laser gas including xenon or structure therefor, and therefore, cannot anticipate these aspects of applicant's claimed invention.

The teachings of Hoffman never explain how xenon is supplied to the laser chamber. The teachings of Ishihara do not contemplate or suggest the use of xenon gas. Therefore, these teachings cannot anticipate a device or method where (firstly) a gas mixture is supplied to a chamber device from gas supply means, and (secondly) xenon gas is supplied to the gas mixture in the chamber device, as required in claims 40 and 42. Claim 42 further requires that the gas mixture is sealed in the chamber device before xenon gas is suppied to the chamber device, which is not contemplated or suggested by the teachings of Hoffman. Similarly, the teachings of Hoffman and Ishihara cannot anticipate a device or method where (firstly) the gas mixture is supplied to gas supply means, (secondly) xenon gas is supplied from xenon gas means and mixed with the gas mixture within the gas supply means, and (thirdly) the gas mixture is supplied to the chamber device and sealed them the chamber device, as required in claim 41 and 44. In summary, since the teachings of Hoffman and Ishihara do not explain how xenon is supplied therein, these teachings cannot contemplate or suggest a specific sequence of supplying xenon gas to the gas mixture into the chamber device or structure for supplying xenon gas to the gas mixture in the chamber device, as required in the present claims 40-44.

Applicant respectfully submits that limitations in claims cannot be simply dismissed as common knowledge or within the skill of the art, and thus, considered to have no limiting effect when comparing the claim with a prior art

reference, as alleged in the final Official action. Any attempt to do so is an attempt to circumvent basic patent principles laid down by the U.S. Supreme Court and the Court of Appeals for the Federal Circuit, which have repeatedly held that to ignore limitations in claims disregards several mainstay patent doctrines. See, e.g., *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 419 (1908) ("[T]he claims measure the invention."); *Pennwalt Corp. v. Durand-Wayland, Inc.*, 4 USPQ2d 1737 (Fed. Cir. 1987) (*in banc*), cert. denied, 485 U.S. 961, cert. denied, 485 U.S. 1009 (1988); *Perkin-Elmer Corp. v. Westinghouse Elec.*, 3 USPQ2d 1321 (Fed. Cir. 1987); *Lemelson v. United States*, 224 USPQ 526, 533 (Fed. Cir. 1985). Since the rejection of applicant's claims does not establish or show the common knowledge and the skill of the art concerning the sequence of supplying xenon or structure therefor, as set forth in applicant's claims, these method steps and structures cannot be anticipated or rendered obvious.

It is respectfully noted that the laser gases are often sold premixed in a single cylinder. In other words, it is common in the art for laser gas mixtures to be mixed separately from the laser apparatus. The teachings of Hoffman and/or Ishihara could use such a system and, in fact, discuss the use of preconditioned xenon-containing gas mixtures at col. 8, lines 52-54. For all these reasons, applicant respectfully submits that the teachings of Hoffman and Ishihara cannot contemplate or suggest a specific sequence of supplying xenon gas to the gas mixture in the chamber device or gas supply means for

supplying xenon gas to the gas mixture in the chamber device provided within the laser apparatus, as required in present claims 40-44.

2. The teachings of Hoffman and Ishihara do not contemplate or suggest a concentration sensing step for detecting the concentration of xenon in the chamber device, as required in claim 43, and therefore, cannot contemplate or suggest this aspect of applicant's claimed invention.

The Official action acknowledged that the teachings of Hoffman do not show a concentration sensing step for detecting the concentration of xenon gas added to the gas mixture in the chamber device, as required in claim 43. The teachings of Hoffman explain that the concentration of xenon gas in the laser chamber 8 is not known. See, for example, the discussion in Hoffman at column 8, lines 41-68, which discusses conducting various test in order to determine the memory effect of xenon. The memory effect of xenon is believed to be the behavior of the laser, after the laser was operated with a xenon containing mixture and refilled without xenon. If the teachings of Hoffman contained a device or method step for measuring the concentration of xenon within the laser chamber, there would be no need for the teachings of Hoffman to carry out multiple tests to determine whether xenon physically remains in the chamber. The teachings of Ishihara have nothing to do with the use of xenon gas. Accordingly, the teachings of Hoffman and Ishihara do not and cannot inherently include a step for measuring xenon concentration in the laser chamber, as required in claim 43.

Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Cont'l Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991) (citations omitted). See also *In re Paine v. Inoue*, 195 USPQ 598, 600 (CCPA 1976); *In re Hansgrig v. Kemmer*, 40 USPQ 665 (CCPA 1939). Since there is no need for Hoffman to detect the concentration of xenon within the laser chamber therein and, in fact, the teachings of Hoffman require performing additional tests to determine the concentration of xenon within the laser chamber, the teachings of Hoffman do not and cannot inherently include a step for measuring xenon concentration in the laser chamber, as required in claim 43.

3. The teachings of Hoffman and Ishihara do not contemplate or suggest the specific gas mixture required in claims 49-52.

Claims 49-52 all require the combination of a gas mixture where the rare gas is Kr and approximately 10 ppm of xenon gas in the laser gas mixture for maximizing output energy of oscillated pulsed laser and minimizing dispersion of the output energy of the oscillated pulsed laser. With respect to KrF lasers, Hoffman proposes about 30 ppm of Xe. The teachings of Ishihara are completely silent with respect to the use of xenon gas.

The Official action pointed out that Hofmann teaches a predetermined amount of Xe gas having a concentration of approximately 10 ppm is supplied from xenon gas supply means to the gas mixture in the chamber device, noting

col. 7, line 5 col. 10, line 30, whereby the chamber device 10 operates to maximize an output energy of the laser and minimize a dispersion of the output energy, these output characteristic are exhibited by the reduction in burst phenomena/transients, again noting col. 7, lines 29-35. However, after a review of these portions of Hofmann, applicant respectfully submits that these teachings do not support the positions taken in the outstanding Office action.

For example, reviewing col. 7, lines 29-35 and Figs. 8B-8D of Hofmann, it is respectfully noted that Fig. 8B shows the energy/voltage characteristic relating to the addition of 30 ppm Xe and non-addition of Xe. Applicant cannot understand the relevance of these discussions in Hofmann in connection with limitation set forth in the present claims concerning the addition of 10 ppm of Xe gas into the chamber device that causes the laser device to operate at a maximized output energy with a minimized dispersion of the output energy. Similarly, Figs. 8C and 8D Hofmann show analyses of transients of burst phenomena at the time of addition of 30 ppm Xe and non-addition of Xe, and have nothing to do with the addition of 10 ppm of Xe gas into the chamber device for operating the laser device at maximize output energy of the laser with a minimum dispersion of the output energy, as set forth in the present claims. Furthermore, the discussion in Hofmann, which was noted in the Office action, could not motivate one of ordinary skill in the art to the combined effect of maximizing in the output of the laser while

minimizing a dispersion of the output energy on the addition of 10 ppm of Xe gas, as presently claimed.

The Official action stated that Hofmann proposes about 30 ppm of Xe (as an example see col. 7, line 20-col. 8, line 5) but recommends for KrF lasers less than 30-40 ppm and that a 8 ppm of xenon in a KrF laser would reduce pulse energy by 8%; noting, col. 9, lines 40-55, and col. 10, lines 26-30, of Hofmann. However, applicant respectfully submits that these latter portions of Hoffman do not support the position proffered in the Official action. Hoffman at col. 9, lines 40-55, and col. 10, lines 26-30, is discussing noble gas additives in a ArF laser. In these discussions, the additives Kr and Xe are added to a typical ArF gas mixture. These discussions are not concerned with a KrF gas mixture, as required in claims 49-52. Therefore, these discussions in Hoffman cannot contemplate or suggest amounts of xenon in a KrF laser gas, as required in claims 49-51.

Perhaps, the Official action misconstrued the discussion in Hoffman at col. 9, lines 40-55. For example, Hoffman at col. 9, lines 51-52, states "As with the KrF laser, the additives reduced the output of the laser." However, this portion of Hoffman is simply referencing the KrF laser and making a comparison to the ArF laser as discussed in this paragraph at col. 9, lines 51-55. In other words, the concentrations of Xe and Kr discussed in the paragraph at col. 9, lines 51-55, of Hoffman are all concerned with additions to the ArF laser, not the KrF laser. Therefore, this portion of Hoffman cannot

contemplate or suggest the amounts of xenon in a KrF laser gas, as required in claims 49-51.

For aforementioned reasons, the teachings of Hoffman and Ishihara cannot render obvious the invention set forth in claims 49-52.

4. The combined teachings of Hoffman and Ishihara do not contemplate or suggest the use of a xenon sensor for detecting the concentration of xenon in the chamber device, as required in claims 45-48, and therefore cannot establish *prima facie* case of obviousness for these claims within the meaning of 35 U.S.C. §103(a).

Claims 45 and 46 are excimer laser claims and claims 47 and 48 are method claims that all require the gas supply means includes an xenon sensor means for detecting an amount of xenon within the chamber device, and a controller for controlling the amount of xenon supplied to the chamber device based on the detected amount of xenon in the chamber device by the xenon sensor means. The teachings of Hoffman and Ishihara do not contemplate or suggest this structure or a method of using this structure.

In the rejection of claims 45-48, the Official action stated that teachings of Ishihara show a sensor means 12 and/or 13 for detecting an amount within the chamber device and a controller 10 for controlling the amount of xenon supplied to the chamber. The block diagram shown in Fig. 1 of Ishihara proposes a fluorine concentration monitor 12 and a pressure monitor 13. The teachings of Ishihara have absolutely no discussion therein concerning xenon gas. Since the teachings of Ishihara do not contemplate or suggest a sensor for

detecting xenon concentration, one of ordinary skill in the art would not have been motivated by such teachings to use a sensor for detecting xenon concentration in the device proposed by Hoffman.

Applicant respectfully submits that the statement in the Official action concerning the addition of a xenon sensor in the device of Hoffman incorporates the impermissible use of hindsight reasoning to modify and combine the references in a manner required to meet the limitations of the claims. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). There is no suggestion or motivation in either Hoffman or Ishihara for combining these references in the manner required to meet each and every limitation of applicant's claims.

Perhaps, it is the position of the Official action that one of ordinary skill in the art would change the fluorine concentration monitor 12 of Ishihara into a sensor for detecting xenon concentration, and then a substitute such a sensor into the teachings of Hoffman. However, applicant respectfully submits that there is no motivation for such a change and substitution within the teachings of Hoffman and Ishihara. It is respectfully noted that the teachings of Hoffman are concerned with minimizing the generation of metal fluorine contaminants due to the corrosive nature of the fluorine gas. See, for example, the discussion in Hoffman at column 3, lines 33-38. In addition, Hoffman explains that fluorine consumption in a discharge chamber is due to fluorine reaction with materials in the chamber, which typically produce contaminants.

See, for example, the discussion in Hoffman at column 5, lines 5-30. In order to minimize fluorine consumption, Hoffman proposes the use of specific materials in the laser structure. Similarly, the teachings of Hoffman teach away from use of additional materials within the laser chamber, in order to minimize contaminants produced by fluorine attack. Since the use of a xenon sensor within the laser chamber proposed by Hoffman will necessarily result in fluorine attack on the xenon sensor, typically producing contaminants, one of ordinary skill in the art would not be motivated to use such a sensor in the laser chamber of Hoffman. As explained by this honorable Board repeatedly, references cannot be properly combined if the effect would be to destroy the invention on which one of the referenced patents is based. *Ex parte Hartmann*, 186 USPQ 366 (P.T.O.Bd.Ap. 1974); *Ex parte Thompson*, 184 USPQ 588 (P.T.O.Bd.Ap. 1974). See also *In re Rosen* 213 USPQ 347 (CCPA 1982). Since the teachings of Hoffman desired to minimize fluorine consumption and resulting contaminants, these teachings require specific materials in the laser chamber and teach away from use of additional materials within the laser chamber that could cause contamination. Therefore, one of ordinary skill in the art would not be motivated to add additional materials into the laser chamber, such as a gas sensor, because the additional materials would increase fluorine consumption and the resulting contaminants that Hoffman desires to avoid.

In addition, it is respectfully noted that during operation of the lasers proposed by Hoffman and Ishihara, fluorine gas is depleted due to its reactive nature. For this reason, the teachings of Ishihara propose monitoring fluorine concentration. However, xenon is an inert gas, and xenon gas is not depleted in the invention claimed or in the device proposed by Hoffman. Since xenon gas is not depleted, there is no motivation within the teachings of Hoffman and Ishihara to monitor xenon concentration within the laser chamber, along the lines proposed by Ishihara for monitoring fluorine. Therefore, these teachings cannot motivate one of ordinary skill in the art to add a xenon sensor to device proposed by Hoffman in order to arrive at the invention claimed.

As mandated in *Ashland Oil Company, Inc. v. Delta Resins Factories*, 227 USPQ 657, 667 (Fed. Cir. 1985), the decision maker must provide a factual basis for the legal conclusion of obviousness as follows:

> To properly combine references A and B to reach the conclusion that the subject matter of a patent would have been obvious, case law requires that there be some teaching, suggestion, or inference in either reference A or B or both, or knowledge generally available to one of ordinary skill in the relevant art, which would have lead one skilled in the art to combine the relevant teachings of references A and B. [citations omitted] The decisions maker's determination as to what objective evidence in reference A or B, or both, or knowledge generally available to one of ordinary skill in art is the nature of a factual finding.
>
> The decision maker, however, after making findings as to the objective evidence, must subjectively analyze these factual findings to determine whether the teachings of references A and B could have been combined. Thus, the ultimate determination as to whether references could have been combined in a legal conclusion.

The *Ashland Oil* court also obligated the decision maker to explain the decision, by setting forth the teachings from the references that were relied on as a factual basis in reaching the conclusion of obviousness. The Court stated:

> The District Court did not elucidate any factual teachings, suggestions, or incentives from this prior art that show the propriety of combination, nor in fact did the District Court even point out what teachings from each of the references, when considered in combination, were relied upon in concluding that the invention of claim 10 would have been obvious. Nor apparently did the District Court give any consideration to teachings in those references which would have lead one of ordinary skill in the art away from the invention of claim 10. We would have to say that the District Court used claim 10 of the '797 Patent as a blue print and abstracted individual teachings from the Rothrock patent, Megson, and Maktin to create the Pep resin of claim 10. [citation omitted] <u>This was error as a matter of law.</u> (emphasis added)

In support of the above, the Court cited the cases of *ACS Hospital Systems v. Montefiore Hospital*, 221 USPQ 929, 933 (Fed. Cir. 1985); *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 220 USPQ 303, 311, 312 (Fed. Cir. 1983); and *In re Sernaker*, 217 USPQ 1, 5 (Fed. Cir. 1983), which have frequently been cited by the Federal Circuit for supporting the above well-established principles.

Applicant respectfully submits that the prior art rejection of their claims does not elucidate any factual teachings, suggestions or incentives from the teachings of Hoffman and Ishihara, showing the propriety of the combination of these teachings. Further, the Official action has not given any consideration to the teachings in these references which would have lead one skilled in the art away from the invention as defined in applicant's claims. Accordingly, applicant respectfully submits that the Official action has not comply with the

mandate set forth in *Ashland Oil.* Moreover, the Official action has failed to satisfy the burden of establishing a *prima facie* case of obviousness by showing some objective teaching or generally available knowledge that would lead one skilled in the art to combine the teachings of the cited references. See *In re Fine*, 5 USPQ2d 1596 (Fed. Cir. 1988). For such reasons, applicant respectfully submits that the rejection of the present claims under 35 U.S.C. §103 constitutes an unsupported, arbitrary and erroneous legal conclusion of obviousness.

5. The data in applicant's specification disclosure showing unexpected results for the invention claimed rebuts any alleged *prima facie* case of obvious over the teachings of Hoffman and/or Ishihara.

The teachings of Hofmann propose at column 7, line 30, that "The energy is lower with Xe over the entire range." See Fig. 8B of Hoffman. Fig. 8A of Hoffman shows a laser output exhibits a tendency of decrease with addition of Xe. These teachings in Hoffmann are opposite to the presently claimed invention, where energy output is maximized at about 10 ppm Xe in the laser gas. Furthermore, the teachings of Hoffman are completely silent with respect to minimizing energy dispersion at about 10 ppm Xe in the laser gas, as required in applicant's claims.

The most pertinent teachings of Hoffman concerning amounts of xenon appear at three different portions thereof. These include the following discussions:

(1) Column 2, lines 33-34:

> Tests performed show substantial improvements in energy stability with the addition of about 30 ppm of Xenon to a KrF laser. Tests show improved performance for the ArF lasers with the addition of about 6-10 ppm of Xe or 40 ppm of Kr.

(2) Column 9, lines 45-49:

> Without the additives the average 3 sigma for the laser was about 5 %. About 6-10 ppm of Xe reduced 3 sigma to above for 4% (a 20% improvement). [This is for an ArF laser.] For the same improvement with Kr about 40 ppm were required.

(3) Column 10, lines 27-30:

> Recommended ranges of Xe for KrF lasers is less than about 30 to 40 ppm. Recommended ranges of Kr for ArF lasers is less than about 40 ppm and recommended Xe ranges is less than about 10 ppm.

These discussions in the teachings of Hofmann do not contemplate or suggest an excimer laser output control method used in an excimer laser, where the xenon contained within the gas mixture in an amount of about 10 ppm **both** maximizes an output energy of the oscillated pulsed laser and minimizes a dispersion of the output energy of the oscillated pulsed laser, as required in applicant's claims.

The present applicant discovered that approximately 10 ppm of Xe gas in the laser gas mixture is effective for actually increasing energy of the laser output. See Fig. 3 of the present application. This is surprising and unexpected in view of the teachings of Hoffmann. All of applicant's claims define either a method step or structure for controlling the concentration of xenon gas in the laser gas mixture to an amount of approximately 10 ppm,

which amount effectively reduces the bursting and spiking phenomena in the pulsed laser output while also increasing energy of the pulsed laser output.

As shown in Fig. 3 of the present application, the applicants discovered the point that the laser output becomes maximum and the point that a dispersion of the output energy becomes a minimum are both with the addition of 10 ppm of Xe. The teachings of Hoffman do not contemplate or suggest achieving both maximum output and minimum dispersion at 10 ppm of Xe, as opposed to other amounts of Xe, such as the amounts of 6 and 40 ppm proposed therein. For example, Fig. 8A of Hoffman shows that the laser output is gradually decreased in proportion to the increase in the concentration of Xe. Applicant respectfully submits that the discovery of maximum output and minimum dispersion of the laser by use of about 10 ppm of Xe in the laser gas mixture is unexpected, and thus unobvious from the teachings of Hoffman. Since the teachings of Ishihara have absolutely no discussion therein concerning xenon, the unexpected advantages of using about 10 ppm of Xe in the laser gas mixture must necessarily distinguish the invention claimed from the teachings of Ishihara.

Applicant respectfully submits that the showing of improved properties as shown in Fig. 3 of the present application concerning the maximum output and a minimum dispersion using about 10 ppm of xenon in the laser gas demonstrates substantially and unexpectedly improved results, which are described in applicant's specification as remarkable. Therefore, applicant

respectfully submits that the showing in Fig. 3 of the present application and the statements in the present specification are sufficient to establish unexpected results and thereby distinguish the presently claimed invention from the teachings of Hoffman. *In re Soni*, 54 F.3d 746, 34 USPQ2d 1664 (Fed. Cir. 1995).

In response to the aforesaid arguments, an Official action stated that Hoffman teaches the unexpected advantages achieve by the presently claimed invention, e.g. the amounts of xenon gas in the laser gas mixture. Firstly, as discussed above, the teachings of Hoffman never contemplate or suggest the use of approximately 10 ppm of Xe gas in the laser gas mixture is effective for actually increasing energy of the laser output, while minimizing dispersion of output energy. At best, Hoffman proposes the use of a much wider range of Xe gas in the laser gas mixture (6-10 ppm, 30 ppm, and 40 ppm) compared to the narrow limitation of approximately 10 ppm of Xe required in applicant's claims. Applicant discovered that the narrow range of approximately 10 ppm of Xe required in applicant's claims unexpectedly maximizes output energy of excimer laser while minimizing a dispersion of the output energy. The teachings of Hoffman do not discuss these properties, and especially do not discuss these properties in connection with concentrations of xenon. Therefore, it is impossible for the teachings of Hoffman to remotely contemplate the unexpected advantages of the presently claimed invention.

In view of the foregoing amendments and remarks, favorable consideration and allowance of claims 40-52 are respectfully requested. While it is believed that the present application is in condition for allowance, should the examiner have any comments or questions, it is respectfully requested that the undersigned be telephoned at the below-listed number to resolve any outstanding issues.

In the event this paper is not timely filed, applicant hereby petitions for an appropriate extension of time. The fee therefor, as well as any other fees which may become due, may be charged to our deposit account No. 22-0256.

Respectfully submitted,
VARNDELL & VARNDELL, PLLC
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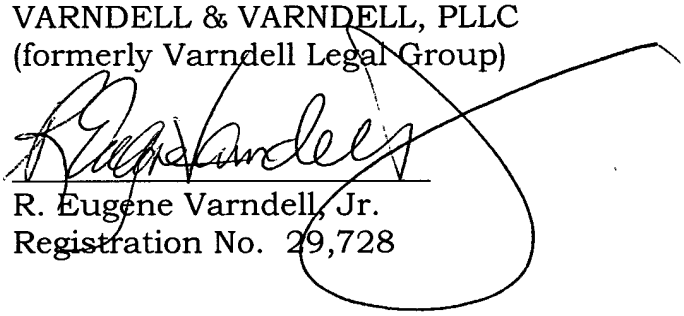

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